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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,607	01/31/2006	Masateru Nakamura	126868	7140
25944 7590 11/10/2008 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
EXAMINER				
STALDER, MELISSA A				
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1793				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/566,607

**Applicant(s)**

NAKAMURA, MASATERU

**Examiner**

MELISSA STALDER

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01-31-06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/55/08)  
Paper No(s)/Mail Date 01-31-06
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Line 11 recites the limitation "its bottom end" but applicant has not clearly stated whether this phrase describes the seed crystal or the support rod.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter (US 6,086,672) in view of Vodokov (US 6,863,728) in view of Lundberg (US 4,349,407).

Hunter teaches the growth of a bulk single crystal containing silicon carbide (title) in a highly non uniform thermal gradient furnace (col. 2, lines 37-45). The crystal is formed from the solution (Fig. 8B) in a columnar furnace with

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heat insulating walls. The heating takes place on the bottom end (Fig. 8B – heating coils) and a cooling system is present at the top (Fig. 3) (col. 7, lines 7-9). The heat susceptor is the column walls and the cooling susceptor is a stainless steel rod through which cooling water runs through (col. 7, lines 7-16). Hunter does not teach the material rod or the use of silicon carbide alone. Hunter does not teach a staged crystal growing process, therefore, it is assumed that the crystal is grown continuously.

Vodokov teaches the use of a source (silicon carbide), a seed crystal, and a support rod (figure 4). The seed crystal is sealed within a multi-element system that includes a ring element (cylindrical susceptor). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the temperature gradient of Hunter with the crystal arrangement of Vodokov because Vodokov teaches that this seed technique using silicon carbide prevents polycrystalline deposits and allows for greater control (Preferred Crystal Growth Methodology).

Lundberg teaches a method of growing single crystals of SiC using a solvent of molten lithium (Group I element).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of growing crystals in Hunter and Vodokov with the solvent of Lundberg because Lundberg teaches that the liquid-phase growth of SiC single crystals is more cost efficient due to the lower temperatures required (col. 1, lines 46-50).

Claims 3, 5, 6, 8, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter (US 6,086,672) in view of Vodokov (US 6,863,728) in view of Lundberg (US 4,349,407) as applied to claims 1 and 2 above, and further in view of Okojie (US 6,794,213).

Hunter, Vodokov, and Lundberg do not teach a counter-bore. Okojie teaches a counter-bore. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the counter-bore of Okojie with the method of Hunter, Vodokov, and Lundberg because the counter-bore allows for greater control over growth of the crystal and contact with the solvent as then both the source and the growing crystal can be moved toward or away from each other.

Regarding claim 5, Vodokov teaches a first stage of lateral expansion and then a second stage of growth of the crystal. This is caused by an adjustment using the temperature gradient (col. 8, lines 27-39). Lundberg teaches that the rate of growth is dependent on the temperature of the solution, therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to pull the crystal from the solvent to adjust crystal growth.

Regarding claim 6, Hunter teaches the use of heat shields to shield the walls of the inner chamber (col. 6, lines 6-11). Vodokov teaches a support rod with an outside diameter larger than other parts of the columnar workpiece (figure 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the insulation of Hunter with the support of Vodokov

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because Hunter and Vodokov both teach the importance of temperature control in the crystal growing process.

Regarding claims 8, 9, and 10, the discussion above and the first rejection encompass these limitations.

Claims 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter (US 6,086,672) in view of Vodokov (US 6,863,728) in view of Lundberg (US 4,349,407) in view of Okojie (US 6,794,213) as applied to claims 3, 5, 6, 8, 9, and 10 above, and further in view of Gwo (US 2005/0106849). Hunter, Vodokov, Lundberg, and Okojie do not teach a buffer mechanism. Okojie teaches a buffer mechanism (0010). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the buffer mechanism of Gwo with the crystal growing method of Hunter, Vodokov, Lundberg and Okojie because this mechanism allows for movement of the support rod and creates a smooth surface so that it can be easily adjusted.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MELISSA STALDER whose telephone number is (571)270-5832. The examiner can normally be reached on Monday-Friday, 8:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234.

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The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MS

November 4, 2008

/Melvin Curtis Mayes/  
Supervisory Patent Examiner, Art Unit 1793